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ABSTRACT

This study tried to determine whether (1) the ACT composite score, (2) high school percentile rank (HSPR), or (3) a combination of these were good predictors of academic success in college for the marginal student. The marginal student was defined as one not meeting standard admission requirements, but one whose ACT scores indicated some reasonable prospect of success. The records of 204 marginal students at Quincy College, Illinois during the period 1963-1969 were examined (including their attrition rate, their academic standing, and their graduation record) and a correlation study was made on their ACT composite scores, their HSPR, and semester GPA's. A higher correlation was obtained by combining ACT and HSPR than for either used separately. The multiple correlation was not as substantial, however, as might be desirable. (AF)

ACADEMIC PREDICTION AND THE MARGINAL STUDENT

By

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For

EPDA Institute 1969-1970

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There are many decision processes in higher education which require estimating a student's future scholastic performance. Important decision areas include admission, attrition, readmission, and the general system of academic standing.

The topic of college academic prediction has been widely researched according to Fishman and Pasanella (1960). High school grades have been consistently used to predict college achievement (Bloom & Peters, 1961). Some weighted combination of high school grades and ACT scores is found to be a more reliable predictor of college academic success than high school grades alone (Richard & Lutz, 1968). The prediction of academic success is prime when colleges are faced with the selection or rejection of students whose previous academic record leaves some doubt as to the student's ability to academically succeed in college. The question remains - - are high school grades and ACT scores reliable academic success predictors for the marginal collegian?

The subject of this research deals with the marginal student or that student defined as having previous academic records below admission norms of a given college, but whose ACT scores indicate some reasonable prospect of success in college.

This study includes marginal freshmen who were enrolled at Quincy College, a small liberal arts college in Illinois, during the period of 1963-1969. The names and academic records of these students were obtained from the office of the Academic Dean. A total sample of 204 marginal students who submitted their ACT scores as part of their entrance requirements were selected for study. Of the 204 students' records reviewed during the 7 year period, 159 were male and 45 were female. In each class, the mean age was 18 with males outnumbering females about 4 to 1.

Parent education ranged from 6 years of primary school and 8 years of college on the part of the fathers to 4 years of grade school and 6 years of college on the part of the mothers. Eleven of the fathers and 2 of the mothers are deceased. The largest number of students selected majors in business administration (24%) while the least number chose the fields of chemistry, art, drama or economics.

Insert Table I

Reviewing the academic records of the 204 marginal students studied, 71 (44.51%) of the 159 males and 24 (40.0%) of the 45 females were dismissed for poor scholarship. The majority of these students left by the end of their second semester in college while two were dismissed as seniors. Over the seven year period, 24 males and 8 females graduated. While the graduating males averaged slightly over 9.25 semesters of study, females took about 8.50 semesters to complete degree requirements. Fourteen of the 32 graduating students (43.75%) majored in business administration or

elementary education. It is interesting to note that although 71 (44.5%) of the males and 17 (37.77%) of the females were removed from academic probation by the end of their first semester in college, 16 males and 7 females were replaced on probation during their second to fifth semesters. Of these 23 students, 11 were dismissed for poor scholarship at the end of their second semester after returning to probationary status. Seven of the 23 (4 males and 3 females) reacquired good standing and graduated.

Insert Table II

Recent studies have shown correlation coefficients between ACT composite scores and first semester college GPAs (grade point averages) to range from 0.36 to 0.70 (Parsons, 1967). According to the 1965 ACT Technical Report, the mean composite ACT score of college bound seniors is 20 with a standard deviation of 5.0 and a standard error of estimate of approximately one-fifth of a standard deviation or 0.2 SD. During the academic years of 1963-1969, Quincy College used an 18 ACT composite score and a "C" high school average as minimum requirements for non-probationary college admission.

Since by definition the marginal student does not meet scholastic norms for admission but does show some reasonable prospect of academic success as demonstrated on his ACT composite score, the following questions were asked:

(1) Is the ACT composite score a good predictor of college

academic success for the marginal student?

(2) Is high school percentile rank (HSPR) a good predictor of academic success for the marginal student?

(3) Is a combination of ACT composite score and HSPR a better predictor of college academic success for the marginal student than either taken alone?

PROCEDURE

A correlation study was made on the ACT composite scores, high school percentile ranks and semester GPAs for male and female marginal students. Means and standard deviations of HSPR (HSPR was converted to a T-score having a mean of 50), ACT composite scores and semester GPAs were computed for male and female marginal students. Due to the large number of students who either left or were dismissed for poor scholarship after one semester, first semester means and standard deviations were made on two samples: the total N and an N of students who remained longer than one semester.

Insert Table III

The male mean high school percentile rank was 44 with a 6.9 standard deviation. Female high school percentile rank was one point lower (43) with a slightly larger standard deviation (8.6). ACT composite for males showed a mean of 18 and a standard deviation of 5.9; female ACT composite mean was 15 with a 3.0 standard deviation. When

GPA means and standard deviations were compared, male GPA mean approximated 1.9 while female GPA mean ranked about 0.2 points lower with a 1.7 (GPA is based on a four point scale).

Insert Table IV

Grades of women correlated with ACT composite score and high school percentile rank in a range from .1651 to .3665. The same type correlation for males ranged from .1257 to .2132. The minimum male correlation might be accounted for by a noticeable drop in GPA for males in their second semester.

High school percentile rank and GPA correlated highest for males in their third semester of study (.2132) but not as high as for females in their third semester (.3665). ACT composite and GPA correlated lowest during first semester for females and highest during second semester. ACT composite and GPA correlated highest during first semester for males and lowest during second semester.

High school percentile rank, ACT composite score and GPA were combined to obtain a multiple correlation. The [redacted] correlation between ACT composite and high school percentile rank for males was .1449 while for females the [redacted] correlation was .2217.

As might be expected, a higher correlation was obtained by combining ACT and high school percentile rank than for either used separately.

In order to attempt a more accurate prediction of future GPA for the marginal student, multiple regression equations were computed.

Insert Table V

With both males and females, the lowest standard errors of estimate were found in the first and third semesters. The standard error of estimate for the second semester was almost double that of the other two semesters. This seems to indicate that a more accurate prediction of GPA could be made from regression equations computed for each semester than from minimum cut-off scores of GPA and ACT composites.

SUMMARY AND CONCLUSIONS

ACT composite scores and high school percentile ranks both have positive correlations with semester GPAs. However, these correlations are not as high as would be hoped for. The multiple correlation of GPA with ACT composite score and high school percentile rank is somewhat better than the correlation of either taken by itself. This is in agreement with the conclusion drawn by Richard & Lutz (1968) for average students.

The multiple correlation is not as substantial as might be desired. The regression equations computed for each semester seem

to provide a more accurate and reliable method of predicting college success for the marginal collegian.

If marginal collegians are to be assisted in achieving academic success, different predictive methods must be used than those used with the average student. This study indicates that a regression equation for each semester is one possible method. More research and study is needed in the area of prediction of academic success for the marginal student.

ACT Technical Report, 1965 edition. Iowa City, Iowa: American College Testing Program, 1965, pp. 12-14.

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Parsons, L.J. and others. "Relative Usefulness in Predicting Academic Success: ACT and other variables", J. Exp. Educ., 35:1-29. Winter 1967.

Richards, James M. and Sandra Lutz. "Predicting Student Accomplishment in College from ACT Assessment", J. Educ. Measurement, 5:17-29, Spring 1968.

Table I -- Majors Selected

	M	F	N		M	F	N
Accounting	8		8	History	10	4	14
Biology	12	3	15	Mathematics	7		7
Bus. Admin.	48	2	50	Music	2	3	5
Chemistry	2		2	Phys. Educ.	7	6	13
Economics	4		4	Pol. Science	5		5
Elem. Educ.	2	13	15	Psychology	6	2	8
English	6	3	9	Sociology	5	3	8
F.A.-Art	2	1	3	Liberal Arts	34	3	37
F.A.-Drama	2	2	4		159	45	204

Table II -- Semesters for Graduation and Majors

Semesters Needed to Complete Degree Requirements:

	7	8	9	10	11	N
Males		7	9	5	3	24
Females	2	3	1	2		8
						32

Majors of Graduates:

	M	F	N
Accounting	2	1	3
Biology	1		1
Bus. Admin.	8		8
Economics	2		2
Elem. Educ.	1	5	6
F.A. - Drama	2		2
History	2		2
Phys. Education	1		1
Pol. Science	1		1
Psychology	1	1	2
Sociology	3	1	4
			32

Table III -- Statistical Data

	All males 1st semester: N=159	Ret. males 1st semester: N=104	Ret. males 2nd semester	Ret. males 3rd semester	All females 1st semester: N=45	Ret. females 1st semester: N=39	Ret. females 2nd semester	Ret. females 3rd semester
Sem. GPA mean	1.7838	1.9571	1.8571	1.9021	1.7411	1.7705	1.7290	1.7151
Sem. GPA S.D.	.6668	.5077	.6935	.4886	.4755	.4906	.7013	.4838
ACT mean	18.4843	18.8173	18.8173	18.8173	15.5111	15.8205	15.8205	15.8205
ACT S.D.	5.2481	5.9231	5.9231	5.9231	3.3140	3.0338	3.0338	3.0338
HSPR mean	44.9100	44.6951	44.6951	44.6951	43.9755	43.6897	43.6897	43.6897
HSPR S.D.	6.9599	6.9372	6.9372	6.9372	8.1324	8.6276	8.6276	8.6276
S.E.E.	.4174	.2372	.4663	.2200	.2187	.2344	.4401	.2050
Beta 1	.2361	.2331	.1525	.2278	.1931	.1143	.2634	.1948
Beta 2	.1540	.2439	.1848	.2462	.1683	.2296	.2351	.3233
$Ry*x_1x_2$	.2706	.3120	.2219	.3102	.2770	.2782	.3900	.4128
R GPA & ACT	.2229	.1977	.1257	.1921	.2220	.1651	.3155	.2665
R GPA & HSPR	.1338	.2101	.1627	.2132	.2015	.2549	.2935	.3665
R ACT & HSPR	.0853	.1449	.1449	.1449	.1721	.2217	.2217	.2217

MALES

	1st Sem-all Ss			1st Sem-Ret Ss			2nd Sem-Ret Ss			3rd Sem-Ret Ss		
	X_1	X_2	Y	X_1	X_2	Y	X_1	X_2	Y	X_1	X_2	Y
X_1		.0853	.2229									
X_2	.0853		.1338									
Y	.2229	.1338										
X_1					.1449	.1977						
X_2				.1449		.2101						
Y				.1977	.2101							
X_1								.1449	.1257			
X_2							.1449		.1627			
Y							.1257	.1627				
X_1											.1449	.1921
X_2										.1449		.2132
Y										.1921	.2132	

FEMALES

	1st Sem-all Ss			1st Sem-Ret Ss			2nd Sem-Ret Ss			3rd Sem-Ret Ss		
	X_1	X_2	Y	X_1	X_2	Y	X_1	X_2	Y	X_1	X_2	Y
X_1		.1721	.2220									
X_2	.1721		.2015									
Y	.2220	.2015										
X_1					.2217	.1651						
X_2				.2217		.2549						
Y				.1651	.2549							
X_1								.2217	.3155			
X_2							.2217		.2935			
Y							.3155	.2935				
X_1											.2217	.2665
X_2										.2217		.3665
Y										.2665	.3665	

X_1 = ACT composite scores
X_2 = HSPR
Y = Semester GPA

Table IV -- Correlations

Table V -- Regression Equations

All Males First Semester:

$$Y = .5664 + .0300*X_1 + .0015*X_2 + .4174 \text{ (SEE)}$$

Returning Males First Semester:

$$Y = .7834 + .0200*X_1 + .0018*X_2 + .2372 \text{ (SEE)}$$

Returning Males Second Semester:

$$Y = .6952 + .0179*X_1 + .0018*X_2 + .4663 \text{ (SEE)}$$

Returning Males Third Semester:

$$Y = .7733 + .0188*X_1 + .0017*X_2 + .2200 \text{ (SEE)}$$

All Females First Semester:

$$Y = .8788 + .0277*X_1 + .0010*X_2 + .2187 \text{ (SEE)}$$

Returning Females First Semester:

$$Y = .9077 + .0185*X_1 + .0013*X_2 + .2344 \text{ (SEE)}$$

Returning Females Second Semester:

$$Y = -.0693 + .0609*X_1 + .0019*X_2 + .4401 \text{ (SEE)}$$

Returning Females Third Semester:

$$Y = .4314 + .0311*X_1 + .0018*X_2 + .2050 \text{ (SEE)}$$

Y = GPA (grade point average)
X_1 = ACT composite score
X_2 = HSPR(high school percentile rank)

All Males: N=159
Returning Males: N=104

All Females: N=45
Returning Females: N=39